Noise from sources close to the ears

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Noise from sources close to the ears

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With traditional measurement methods for noise exposure of humans for e. g. assessment of work environment conditions, values are measured for the sound field the person is surrounded by. This is historically conditioned because our reference material for hearing damages and annoyance is related to such values. When the sound source is close to the listener's ears as e. g. headphones no surrounding sound field exists and such values can not be determined. Since it is still needful to relate the values for the situation with sources close to the ear to values for the surrounding sound field, it is required to determine the values of the surrounding field, which would have caused the same real ear exposure as the source close to the ear. Recently ISO published the ISO 11904-1 which standardize methods for real-ear measurements and conversion to free-air-related values. It is expected that part 2 specifying measurement methods using manikins will be completed in 2003. The presentation will present the principles and background for the 11904 series, including examples of exposure from different headphones measured with real ear techniques and with manikin technique.

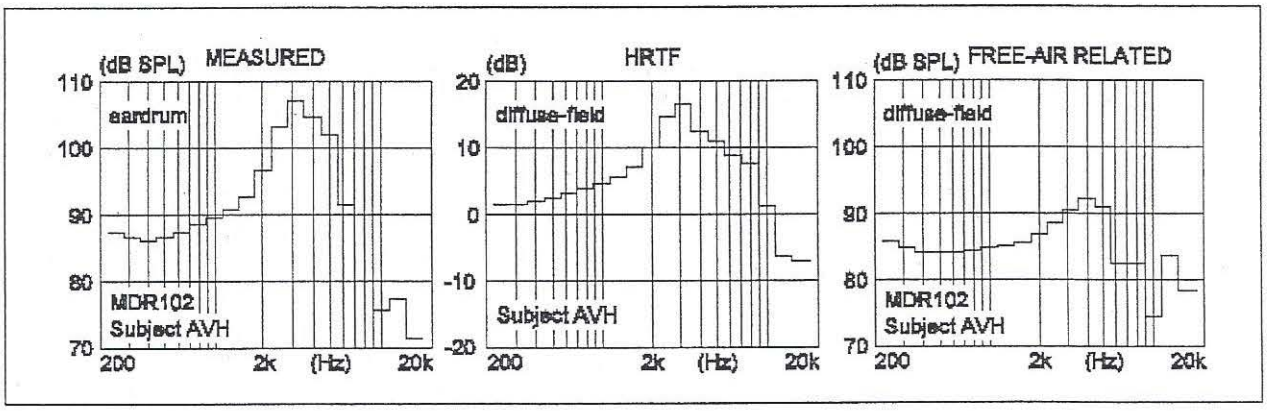

Figure 1. Example of derivation of diffuse-field related third-octave spectrum from eardrum measurements. Left frame: Spectrum at eardrum. Center frame: Diffuse-field eardrum HRTF. Right frame: Diffuse-field related spectrum. A-weighting and summation gives a diffuse-field related sound pressure level of 99.5 dB(A). Sony MDR102 headphone supplied with pink noise (500 mV 20-20,000 Hz). Subject AVH left ear.